

REMARKS/ARGUMENTS

Reconsideration of the present application, as amended, is respectfully requested.

Since the present amendment raises no new issues for consideration and, in any event, places the present application in better condition for consideration on appeal, it is respectfully requested that this amendment be entered under 37 C.F.R. § 1.116 in response to the last Office Action dated October 13, 2006, which made final rejections as to the pending claims.

A. Status of the Claims

Claims 1-13 are presented for continued prosecution. Claim amendments have not been made at this time.

B. Objections to the Specification and Specification Amendments

The Examiner objected to the specification for referring to the claims. Applicants have amended the specification to replace "claim" with "item". In addition, the subject matter of claims 1-13 has been added to the Summary of the Invention as "items" 1-13. Applicants submit that it is customary U.S. practice to refer to the claims as "items" in the Summary of the Invention.

C. Claim Rejections under 35 U.S.C. § 103(a) and 35 U.S.C. § 102(b)

Claims 1, 4, and 7 had been rejected as being unpatentable over Andersen (U.S. 4,316,379) in view of Kergen (U.S. 5,477,723). Claims 5 and 6 had been rejected as being unpatentable over Andersen in view of Kergen and Cao (U.S. 6,769,280). Claims 8-13 had been rejected as being anticipated by Kergen.

The Examiner stated that Kergen teaches regulating the downholder force based on a detection of the increase of the opening of the workholder (the thickness trend of the material) to a point (critical value) at which crinkling begins. In addition, the Examiner stated in par. 1 on page 3 of the Office Action that point III in Fig. 3 of the present application corresponds to the point at which crinkles appear as described in col. 5, lines 3-9 of Kergen.

1. Kergen does not teach or suggest controlling the downholder on the basis of a predetermined thickness trend and/or a trend or critical value derived from the predetermined thickness trend

Claim 1 recites that the downholder is controlled on the basis of a predetermined thickness trend and/or a trend or critical value derived from the thickness trend.

The predetermined thickness trend of the present invention can be determined by performing a trial run prior to deep drawing a new product series (par. 4 on page 9 of the application). Similarly, the trend or critical value derived from the thickness trend can be calculated as a mathematical derivative of the thickness trend obtained during a trial run. An example of a thickness trend obtained from such a trial run is shown in Fig. 3 of the present application.

As shown in Figure 3 and described in paragraph 1 on page 9 of the application, the distance s_0 between the die and the blank holder initially has a substantially constant value (range I-II) and then gradually increases at a constant inclination (range II-III) corresponding to a constant downholder opening speed v_0 . Point III in Figure 3 shows "a bend" in downholder opening trend s_0 which indicates the actual starting point of crinkle formation. Thus, by performing a trial run, it is possible to identify point III as the actual starting point of crinkle formation. A predetermined thickness trend can thereby be obtained prior to deep drawing a new product series to precisely identify point III. Thereafter, the predetermined thickness trend and/or trend or critical value derived therefrom can be implemented in a control unit to optimally control deep drawing (lines 3-5 on page 10 of the application). Without performing a trial run to predetermine the thickness trend, it is difficult to precisely identify point III as the actual starting point of crinkle formation.

As cited by the Examiner, Kergen teaches that the distance between the die and the blank holder increases as soon as crinkles appear (col. 5, lines 3-5 of Kergen). Kergen does not indicate that the distance can increase for reasons other than crinkle formation. Consequently, those of skill in the art having read Kergen and observing an increase in the distance between the die and the blank holder will logically believe that the increase in distance corresponds to crinkle formation.

The teachings in col. 5, lines 3-5 of Kergen are not the claimed predetermined thickness trend and/or trend or critical value derived therefrom. Instead, the point where the distance

between the die and the blank holder increases as taught by Kergen corresponds to point II in Figure 3 of the present application, not point III (point II in Figure 3 is the point where the distance s_0 begins to gradually increase between the die and the blank holder, while point III is the point where crinkle formation actually begins). Thus, since Kergen does not perform a trial run to predetermine the thickness trend, Kergen mistakenly identifies point II as the starting point of crinkle formation.

The distinction between point II believed by Kergen to be the starting point of crinkle formation and point III being the actual starting point of crinkle formation as disclosed in the present application occurs because the diameter of the blank gradually decreases and the material in the blank edge must be accommodated on an increasingly smaller surface (see line 30 on page 2 to line 3 on page 3 of the application). As a result of performing a trial run to predetermine the thickness trend and/or trend or critical value derived therefrom as recited in claim 1, the actual starting point of crinkle formation can be identified as point III. The total downholder force is therefore minimized by the present invention compared to Kergen, because the present invention accurately recognizes the start of crinkle formation at point III, while Kergen believes crinkle formation starts at point II.

Applicants respectfully submit that claim 1 is not obvious based on the combination of Andersen and Kergen, because Kergen does not teach or suggest a predetermined thickness trend and/or a trend or critical value derived therefrom as recited in claim 1. Thus, Kergen does not teach or suggest one of the advantages of the claimed invention which is the minimization of the total downholder force by identifying the actual starting point of crinkle formation as point III as exemplified in Figure 3 of the present application.

In addition to the above, Applicants note that the Examiner stated that the thickness measurement at which crinkles appear in col. 5, lines 3-9 of Kergen corresponds to point III in Figure 3 of the application. This is not correct. As mentioned above, Kergen discloses that crinkle formation is noticed by an increase in distance between the die and the blank holder (col. 5, lines 3-5 of Kergen). Based on the teachings of Kergen, the skilled artisan will understand this distance increase as point II in Figure 3 of the present application (i.e., the point where s_0 starts to increase). The skilled artisan will not understand based on the teachings of Kergen that there is a distance increase between point II and point III as the diameter of the blank gradually decreases as described in par. 3 on page 2 of the present application. Since Kergen does not

perform a testing measurement prior to deep drawing a new product series to predetermine the thickness trend, Kergen cannot identify point III as the point where crinkling actually begins. Applicants therefore respectfully submit that claim 1 is not obvious based on the combination of Andersen and Kergen, because Kergen does not teach a predetermined thickness trend and/or a critical value derived therefrom which makes it possible to identify point III as the actual starting point of crinkle formation.

2. Kergen does not teach or suggest a control provided with means for storing a downholder opening trend s_0 and/or a critical value derived therefrom

Claims 8 and 12 recite an apparatus including a control provided with means for storing a desired downholder opening trend s_0 and/or a critical value derived therefrom. Similar to the comments in section 1 above, the desired downholder trend s_0 that is stored is a trend that is predetermined prior to deep drawing. Since the trend is predetermined, the trend can be stored in the control means.

Applicants argued in section 1 above that Kergen does not teach or suggest performing a trial run to predetermine the thickness trend and/or a critical value derived therefrom. Since Kergen does not perform such a trial run, Kergen cannot store a desired downholder trend in the control. Thus, contrary to claims 8 and 12, the movement of the downholder of Kergen is not based on a stored trend. Applicants therefore respectfully submit that claims 8 and 12 as well as their dependent claims are not anticipated by Kergen.

D. Claims 5 and 6

Claims 5 and 6 had been rejected based on a combination of Andersen, Kergen and Cao.

Claims 5 and 6 ultimately depend on claim 1 and therefore include the limitations of claim 1. As argued above, Kergen does not teach or suggest controlling the downholder based on a predetermined thickness trend and/or a trend or critical value derived therefrom. Applicants therefore respectfully submit that claims 5 and 6 are patentable over the combination of Andersen, Kergen and Cao.

E. Fees

This Response is being filed within four months from the mailing date of the Office Action. A one-month extension of time is hereby requested. No further fee is believed to be due. If, on the other hand, it is determined that further fees are due or any overpayment has been made, the Assistant Commissioner is hereby authorized to debit or credit such sum to Deposit Account No. 02-2275. Pursuant to 37 C.F.R. 1.136(a)(3), please treat this and any concurrent or future reply in this application that requires a petition for an extension of time for its timely submission as incorporating a petition for extension of time for the appropriate length of time. The fee associated therewith is to be charged to Deposit Account No. 02-2275.

F. Conclusion

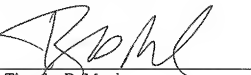
In view of the actions taken and arguments presented, it is respectfully submitted that each and every one of the matters raised by the Examiner has been addressed by the present amendment and that the present application is now in condition for allowance.

An early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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